# Custom-built weaving machines for industrial, technical and high-performance textiles

Autor(en): **Legler, Fritz**

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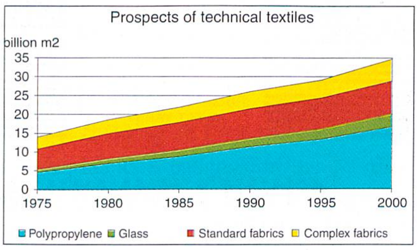
# Custom-built weaving machines for industrial, technical and high-performance textiles

*Fritz Legler, Sulzer Textil AG*

It is undisputed that technical & industrial textiles – and in particular woven fabric constructions – are steadily gaining importance and widening their range of technical applications. Whilst there is no fully conclusive statistical coverage and too many differing national, supranational and industry statistics about the production and trade of woven technical textiles, most sources clearly suggest that this fabric sector is the fastest-growing and most dynamic within the textile industry.

One of our own market reviews conducted in the 90ties revealed that presently some 14% of woven fabric production world-wide is destined for technical and industrial end uses (total fabric production is 215 billion sq.m). This represents roughly 30 billion sq. m. of woven fabric per annum. In general, industrial textiles (i.e. wovens and non-wovens) account for roughly one third of the total textile production in highly industrialised countries throughout the world.

Towards to end of this millennium, we anticipate that the total fabric production will have grown to about 231 billion sq. m. It appears as though technical and industrial textiles are the only market segment projecting a reasonable prospect. The market share of high-performance texiles will probably grow to 15% or 35 billion sq.m by the year 2 000.




## Preferred and new fields with rising potential for expansion of the weaving industry are:

- agriculture
- construction and transportation
- storage and packaging materials
- automotive/medical and ecological sectors

This is in addition to the strong presence of wovens in working, protective and safety clothing.

Woven geotextiles used in civil and hydraulic engineering also have an expanding market outlook.

Innovative and successful product developments in technical textiles and new technologies has opened up new markets for the weaving industry.

Special fibres and yarns with specific properties, high-strength synthetics, polyester and polyamides, polyolefins and polyethylene, glass fibre yarns and new high-performance aramides and carbon fibres act as a multiplier of unlimited application possibilities for technical fabrics.

## Definition of Industrial Textiles:

Industrial textiles are specifically designed and engineered structures that are employed in products, processes or services of mostly non-textile industries.

Based on this definition, industrial textile products are mainly used in three different ways:

1. the fabric can be a component part of another product and directly contributes to the strength, performance and other properties of that product, i.e., for instance, a tire cord fabric
2. the fabric can be used as a tool in a process to manufacture another product, i.e., for instance, filtration textiles in food production or paper machinery clothing in paper manufacturing
3. the fabric can be utilised alone to perform one or several specific functions, like, for example, coated fabrics to cover sports stadiums

## Importance of Industrial Textiles:

We all agree that technical textiles can drastically enhance the performance and success of products that are used in non-textile industries. In automotives, for instance, 75% of the strength of a car tire actually comes from the tire cord fabric used as a core in the tire.

Carbon fibre materials used in structural composite parts for aerospace, civil and mechanical engineering are up to four times lighter and five times stronger than steel.

Some of the modern industries simply would not be the same without industrial textiles. Just think of the MOD (Ministry of Defense) not being in a position to utilise textile materials for their applications.

Heat shields on space vehicles, as another good example, are made of textile fibres that can withstand several thousand degrees Fahrenheit.

Industrial textile materials offer several advantages simultaneously in the same product that no other industrial product could possibly provide, i.e.:

- flexibility
- elasticity and
- strength

### A fabric structure of idustrial textiles can be:

- woven
- non-woven
- knit
- braides
- laminated or
- stitched

used as single layer or multi-layers. Each layer can be made of one or more types of fibres or yarns.

There is an infinite number of fabric designing patterns available to designers that all provide special properties. Fabric properties can, obviously, be further enhanced by manufacturing techniques such as:

- heat-setting
- coating
- and the application of different finishes

Raw materials for industrial textiles come in different forms, like for instance:

- spun yarns
- wires
- pulp and fibres
- monofilaments
- multifilaments
- rovings and even mats

In general, technical textiles are expected to last much longer than traditional consumer fabrics, and fashion trends do not play an important role.

Commercially and economically speaking, industrial textiles are, obviously, offered at higher initial cost than e.g. apparels. Bearing in mind the long life and benefits of those fabrics, the cost should not really be a concern. Industrial textiles can, actually, be used in place of more expensive materials, and, therefore, may bring substantial savings to the overall economy in the longer term.

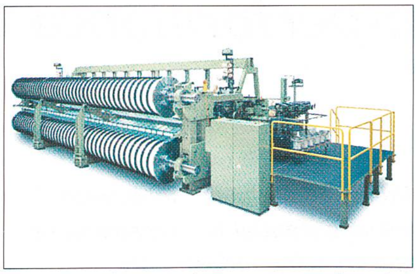
### Woven structures:

Whilst all fabric structures have particular strengths and are favoured for individual end uses, it is probably fair to say that woven constructions fulfil very specific physical requirements, like:

- dimensional stability
- absorption of tensile forces (i.e. mechanical strength)
- precision
- weight and thickness
- density

### Banging in the picks...

Industrial textiles normally consist of stronger materials which are more difficult to handle than ordinary yarns interlaced in traditional clothing fabrics. Moreover, technical textiles are normally much heavier.



*Sulzer Textil Projectile Weaving Machine for forming fabrics – 8.46 m wide weighing some 45 to 50 metric tons*

Thus, where high beat up loads and fabric cover factors are required to reach extreme physical stability, custom-built weaving machines can now be considered essential.

### Paper Machine Clothing:

Large volumes of high performance fabrics and felts are put onto paper machines. The essence and importance of paper machine clothing in paper making is widely appreciated. In principle, we can argue that paper can be made without a paper machine (which can easily cost several hundred million £ sterling each), but it cannot be made without high-tech fabrics being used for forming, pressing and drying of paper.

Fabric designs and properties can have tremendous effects on the quality of paper and the paper making process as a whole.

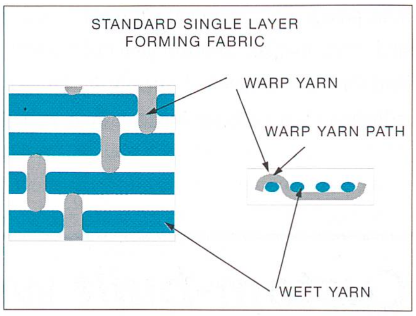
The paper machine consists of three main sections, i.e.:

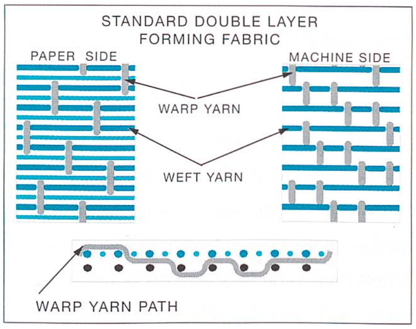
- forming section
- press section and
- dryer section

### Forming fabrics:

Fabrics for the forming section are probably the most critical to design -those fabrics are woven as single, two or three layer constructions.

Single layers use 2–8 harness frames and one layer of warp and weft. Two layer designs have one layer of warp and two sections of weft yarns.

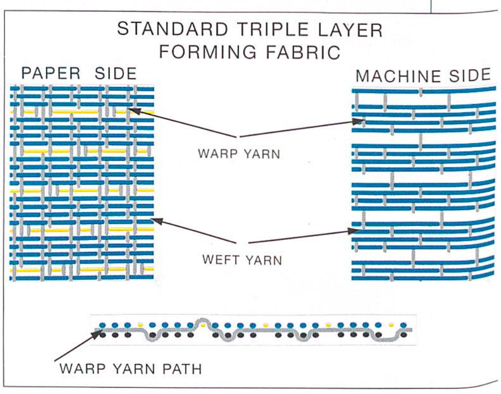



### Advantages of two layer constructions are:

- enhanced stability
- higher resistance to wear and damage
- better sheet formation
- greater water drainage capacity
- more uniform pulp/fibre distribution etc.

Three layer fabrics consist of two separate fabric layers (top and bottom) which are connected with a binder strand. As a result, there are two sets of warp yarns and two sets of weft materials. The top layer tends to be finer than the bottom layer. Three layer constructions are very advantageous as concerns sheet quality and so forth.



Forming fabric designs are very important and can influence various parameters of the fabric itself but also of the paper machine operation, like:

on the fabric side
- air permeability
- fabric stability
- fabric modulus
- fabric caliper etc.

on the paper machinery side:
- drainage
- formation
- fibre retention
- sheet release
- wire mark
- fabric cleaning and life

Today, almost all forming fabrics are made of monofilaments. Yarn diameters range from 0.10 to 0.35 mm.

Geometrically, the weft and warp have to be accurately positioned in the fabric in all three dimensions.

The well established Projectile weft insertion principle proves ideal for manufacturing forming fabrics. Satisfying those stringent demands from forming fabric weavers involved a substantial effort in mechanical and electronic machine design. The result is a large number of design innovations and new solutions in the drive and control technology.

The drive for the shed-forming unit can, for instance, be separate from that for the weaving machine, thus again opening up new application areas that can, normally, not be woven on traditional systems.

Machine components must meet all requirements of heavy-weight fabrics, and must, therefore, be reinforced if and when required. The sley drive (for its appropriate beat up of the weft), warp let-off and fabric take-up have been designed to achieve desired warp tensions of more than 1500 kg/m.

Economically speaking, Projectile machines run much faster than traditional machines used in the field of forming fabrics. 8.5 m wide machines, for instance, run at 130 picks per minute, i.e. 3–4 times faster.

Style changing on Projectile machines for forming fabrics is optimised by the use of an unique custom-built Quick Style Change system.

### Safety and Protective Textiles:

It is commonly believed that an increasing range of protective textiles will be required as general predictions state that the market for top quality protective clothing will further expand in future.

Safety and protective textiles refer to garments and other fabric-related items designed to protect the wearer from harsh environmental effects that may result in injury or death.

Clear moves towards clothing with increased safety and wearer comfort being resistant to high temperatures, protect the wearer against hazardous material and mechanical action are noticeable to a great extent.

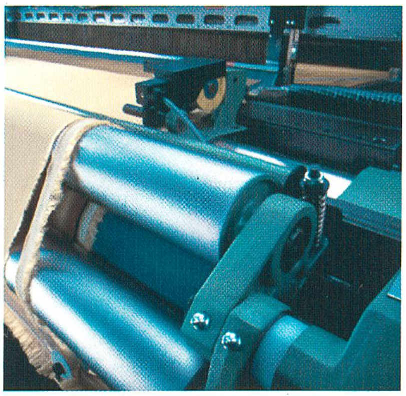
### Aromatic fibres:

Aramids belonging to the group of aromatic polyamides – such as Kevlar/Twaron or Nomex – fulfil the far-reaching requirements in the field of personal protection. High-strength textile fibres are either used alone or in combination with metallic fibres.

It goes without saying that favourable physical properties of Kevlar/Twaron or Nomex – like for instance superior tensile strength, an extremely high degree of impact strength and tenacity, temperature stability and so forth come in useful for protective clothing.

Ballistic protection, aviation, automotive and industry in general fully exploit special properties offered by woven fabrics made of aramides. A huge selection of air-tangled, untwisted and twisted aromatic yarns in counts ranging from dtex 215 to 3300 are woven in large quantities on Projectile and Rapier weaving machines.

### Kevlar Comfort:



*Rapier Weaving Machine – running «Kevlar» at 500 picks / min. at high efficiency*

DuPont and Sulzer Textil have recently completed various tests to establish the weavability of their new «Kevlar Comfort» fibre that affords additional safety in ballistics and splinter protection – at, surprisingly, much reduced weight.

Due to special shedding and tension control facilities on the G6200 Rapier machine, Kevlar Comfort is weavable at machine speeds of up to 500 picks/min. Furthermore, it is to be emphasised that untwisted and unsized warps can effectively be woven with the G6200.

### New fibres – BASOFIL and aluminised substrates:

New fibres have been developed in recent years which can be made into special fire protection suits used under extreme conditions. BASOFIL, a fairly new fibre from BASF gives outstanding thermal insulation properties and offers the advantage that it doesn't melt. Protective garments are, for instance, also made of aluminised rayon or other aluminised substrates such as aramid and glass.

*Walking through fire – enabled by a heat-protective suit made of special textiles*

### Geotextiles:

Ground improvement is the most important and practical technique to change soil properties and improve the safety and the function of structures. Several ground improvement techniques have been broadly used all over the world (i.e. ground replacement / densification & reinforcement).

The reinforcement method by means of geotextiles is very popular due to its simple principle and precise effect.

Permeable synthetic membranes (geotextiles) are specifically designed to be used in civil and hydraulic engineering situations, such as roads, drains, riverbanks, coastlines and embankments and dikes.

### Geotextiles have five basic functions:

- Reinforcement – to strengthen the overall construction
- Separation – to prevent intermixing of non-compatible materials
- Filtration – to permit natural waterflow
- Drainage – to transmit liquids
- Protection – from physical damage

### Geotextiles are segmented into four different groups, i.e.:

- Knitted fabrics (Interlock / Loop)
- Nonwoven fabrics (Mechanical/Heat or Chemical bond)
- Composite fabrics (Needle punching)
- Woven fabrics (Weaving Machine)

### Physical properties of woven Geotextiles:

Physical properties of Geotextiles have to be carefully selected and adapted to the requirements of the construction site. The tensile strength of Geotextiles increases with the increase in the unit weight, and woven Geotextiles typically give extraordinary strength.

A woven geotextile construction with a weight of 100 g per m², for example, has the same strength as a nonwoven with a weight of 400 g per m². The crossing respectively right-angled interlacing of warp and weft in woven constructions results in far better tensile properties than achieved with disordered fibre layers of nonwovens. The tensile strength of a woven fabrics is seven to eight times higher than nonwovens.

Geotextiles are classified into two groups, i.e. high stiffness materials (woven and geogrid) and ductile materials (non-wovens and geonet).

### Main Polymers used:

The most common two polymers for the manufacture of Geotextiles are polypropylene and polyethylene. Polyester may be used when high strengths are required.

### Projectile Weaving Machine – unique in field of Geotextiles:

Woven geotextiles are almost uniquely produced on more than 10 000 Sulzer Textil Projectile Weaving Machines world-wide. The projectile insertion system offers large working width of up to 8.46 m.

### Low production costs due to optimum use of all resources: – Projectile Weaving:

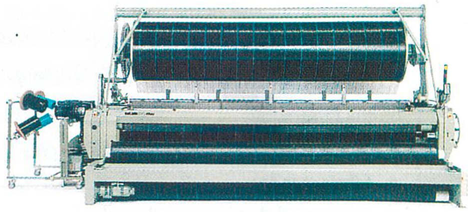
Decisive advantages and perceptible benefits of Projectile machines are attainable by virtue of:

- high weft insertion rate and efficiency figures
- extremely low power and spare parts consumption
- extensive range of yarns which can be woven
- wide spectrum of demanding fabric styles
- great variety of weaving widths
- possibility of simultaneous multi-width weaving
- quick warp and style change facilities and quick turn around

### Tape weaving:

Polypropylene tape fabrics are constantly finding new uses in all sorts of technical applications. Whether it is for:

| | |
|---|---|
| • Packaging | mail & security bags/ general covers |
| • Industry | rubber processing industry |
| • Leisure | shoe liner fabrics |
| • Military | camouflage fabrics |
| • Bedding/Upholstery | fabrics for dust/base covers for furniture |
| • etc. | |



*Sulzer Textil P7100 Projectile Weaving Machine – with high/low beam arrangement – thus doubling the warp running time. High weft insertion rate of up to 1200 m/min. – PP tapes*

### Typical applications of Geotextiles:

| | |
|---|---|
| • Separation | Preventing mud pumping |
| • Reinforcement embankment | Tensile reinforcing |
| • Soft subsoil reinforcement | Softground reinforcement |
| • Drainage of soil structure | Horizontal drain |
| • Control of erosion | Preventing erosion on slope |
| • Filtration | Clogging protected filter |
| • Preventing water pollution | Siltfence etc. |

### Agrotextiles:

Agrotextiles are increasingly put to use in farming and horticulture in woven constructions, where tensile strength and dimensional stability are required. Agrotextiles are made of synthetic materials which are not susceptible to rotting.

The intention of using Agrotextiles is to protect plantations from extreme weather conditions and pests, thus giving increased yields, improved quality of agro products and fewer losses. It also means that the use of weed killers and pesticides can be drastically reduced.

Agrotextiles serve as soil covers and protect against hail storms, insects, rain, sun and wind. They are normally made of narrow polypropylene tapes or of fibrillated yarns. Furthermore, polypropylene, polyethylene or polyester monofilaments are also applied for weaving agrotextiles.

### Hail-protection:

Numerous fruit plantations and vineyards are devastated by severe hail storms on the Continent almost every year, causing damage running into millions of £ sterling.

### Hail-protection fabrics feature following characteristics:

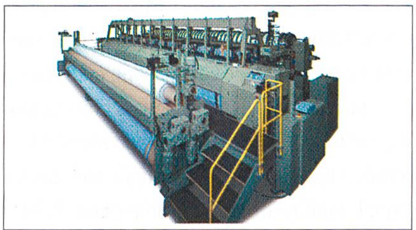
- fabrics are made of UV-stabilised monofilaments in diameters of 0.25 to 0.30 mm

- a mesh construction of 10 x 4 mm
- woven in leno forming technique – since the fabric needs to be vertically and horizontally stabilised
- fabrics are delivered in widths of 2.5 to 5.4 m (first weaving machines are being used on the Continent to go beyond 6 m weaving width)

The life span of Agrotextiles is 15 to 20 years but they are quite often replaced in tune with the renewal of fruit plantations after 10 years.

### Projectile Weaving Machines P7100 P190 to 6.33 N1-1 EP D12:

Universal Projectile weaving machines are used in working width of up to 6.3 m, weaving mesh fabrics in leno constructions. Special and firmly tucked-in selvedges are essential for Agrotextiles – which meet stringent tensile loads required from this kind of fabric usage.



*Sulzer Textil Projectile Weaving Machine P7MRSP – 8.46 m wide*

### Insect-repellent fabrics:

Vegetables, such as cucumbers, tomatoes and aubergines are often attacked by pests. Plants can be infected by up to 25 different types of viruses, leaving the much feared honey dew on leaves.

Insect-repellent fabrics are made of UV-stabilised polyethylene monofilament yarns with a diameter of 0.25 mm. Warp density is 24 ends/cm and 11 picks per cm. Those fabrics are woven in widths of 250 to 540 cm.

### Sail cloth:

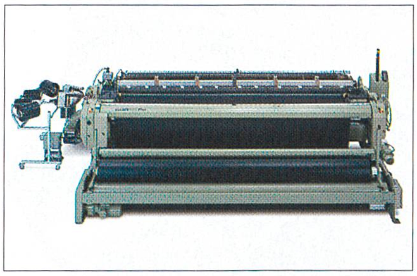
Who can still remember the day when sail cloths were still genuine dense or even stiff cotton fabrics? In winter they were frozen hard as stone and in a summer thunderstorm, the sails presented themselves as wet, unwieldy, heavy and gigantic rags. That has all changed and today, sail cloths consist almost exclusively of Polyester or polyamide multifilament yarns that are normally strengthened with monofilaments-or aramides.

Functional demands made on sails are quite enormous. Fabrics used on sailing boats have to stand the test of storms, should be tear-resistant, be of light weight and be made in a way that the slightest breeze can be exploited.

Sails come in different weight categories, i.e. 120 to 500 g/m², and are fairly dense constructions.

### Costom-built Projectile – P7MR3 S280 N4 SP D12:

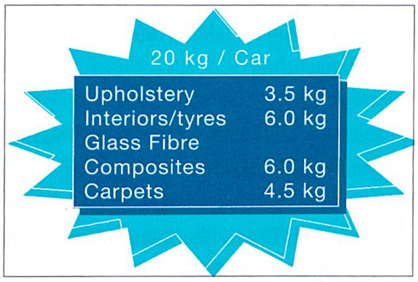
Custom-built Projectile machines with a specifically targeted use of standard machine features, combined with reinforced units, special gears, motors, sensing devices and electronics are successfully applied in this field of heavy-duty weaving.



*Sulzer Textil Projectile Weaving Machine – with capacity for extreme beat-up forces*

### Automotive Textiles – still very much in demand:

One area of technical textiles ranks very highly within the scope of overall fabric production, i.e. automotive textiles. In 1996 and 1997 some 40odd million cars were manufactured globally. About 20 kg of textiles are used in every car which means that some 800 000 tons of textile material is used for automotives.

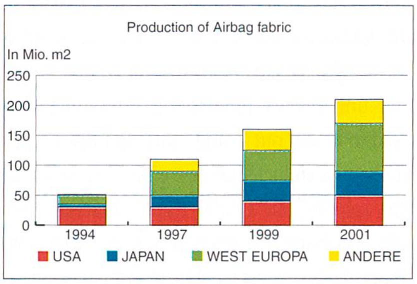



Different fabric forming technologies are also employed in this segment, and depending on regional requirements by consumers and car manufacturers, percentages of e.g. flat woven, circular or warp knit, raschel or leather products vary quite significantly.

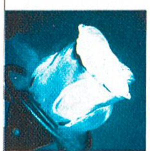
In Europe, for instance, some 40% of automotive textiles are actually flat woven constructions.

### Protective fabric use in cars:

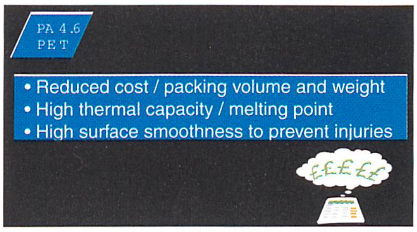
Demands for increased road safety are still coming from both drivers and authorities. Novel restraint systems are being worked on and implemented. From a fabric point of view, it is certainly discernible that the demand for e.g. Airbag fabric is still rising, and our own studies suggest that by the year 2 001 some 200 million sq.m. of fabric will be required. New versions of inflatable bags for the protection against side impacts or head injury are being introduced, and a lot of studies are being carried out to build even more intelligence into bags for controlled deployment and so forth.




It is, however, to be noted that trends like Globalisation have a major impact on system and component suppliers to the Automotive Industry. Like anyone else, car manufacturers make critical demands from their suppliers to decrease costs, to permanently innovate, to design and produce complete modules, to follow their increasing renewal of car models and most importantly, to follow the car manufacturers everywhere throughout the world. Sustaining those requirements means that suppliers need to get bigger to survive in this very competitive, global environment.



## Airbag trends:




## Weaving Machinery for Airbags:

For some considerable time, the dense, coated or uncoated and highly demanding airbag fabric has effectively been woven on Weaving Machines from Sulzer Textil. High reliability of machine settings and a faultless weaving process are key elements to be successful in airbag weaving. Traditionally, airbags were most efficiently woven on Projectile & Rapier machines. In some countries, Waterjets are considered to be an alternative and Airjets are being talked about more often as well.

It is, however, unquestionable that Rapier machines still account for the biggest share of the Airbag market in Europe. Economic pressures in this field mean that any conceivable and unnecessary processes in manufacturing need to be cut out – and more and more trials are being conducted to weave unsized warps. In this respect, our G6200 Rapier machine sets new standards – it offers a realistic chance to weave sizeless constructions at quite considerably lower manufacturing cost. Due to its unique shedding principle, on-line tension control facilities in warp and weft and the fact that the rapiers travel absolutely unguided through the shed, untwisted and unsized warp ends (filaments) are not damaged.

At very high insertion rates of up to 580 rpm (depending on machine width), the G6200 is a very strong contender in the field of airbag weaving.

## Airbags – typical constructions:

**Airbag constructions:**

| | 235 dtex Standard | 235 dtex LDPF | 470 dtex Standard | 470 dtex LDPF |
|---|---|---|---|---|
| Titer (dtex) | 235 f36 | 235 f72 | 470 f72 | 470 f144 |
| Weave | plain 1/1 | plain 1/1 | plain 1/1 | plain 1/1 |
| Construction (th/cm) | 30/29 | 29/28 | 22/21 | 20/19 |
| Weight (g/qm) | 160 | 155 | 240 | 210 |
| Thickness (mm) | 0.24 | 0.21 | 0.37 | 0.32 |
| Strength (N/5 cm) | 2250 | 2100 | 3200 | 3100 |
| Elongation (%) | 39 | 38 | 35 | 32 |
| Tear Strength (N) | 76 | 82 | 120 | 130 |
| Air Permeability (dm/min 500Pa) | <10 | <8 | <10 | <10 |

The majority of airbag constructions would still use Polyamide 6.6 yarns but it is quite possible that other polymers (like e.g. PA 4.6 with better thermal properties than PA 6.6) will find their way into airbag manufacturing.

## Reaching your destination quickly and safely – thanks to automotive tyres:

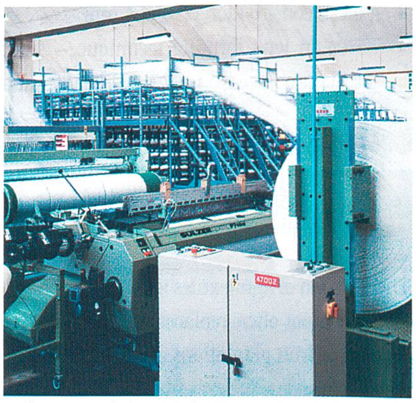
Tyres for cars, construction machinery or airplanes must withstand high mechanical and dynamic forces and feature high-level elasticity and shock resistance. All of those properties are ensured by means of a «textile skeleton», the tyre cord fabric.

*The structure of a radial tyre consists of fabric layers that are arranged radially and diagonally to the tyre axis*

Between twisting and finishing, the weaving machine is the central production facility which decisively influences the quality of tyre cord and subsequent processes. Major manufacturers world-wide use weaving machines from Sulzer Textil to weave tyre cord fabric.

## Sulzer Textil systems leading the field in tyre cord weaving:

- unmatched profitability through low-cost manufacturing
- simple operation of machinery
- constant and high efficiency in weaving header with coarser yarns
- transition from header to body of fabric automatically done without stopping machine
- no warp and weft waste
- optimum tension control
- perfect winding of fabric onto giant batches of up to 4 tons with constant fabric pressure

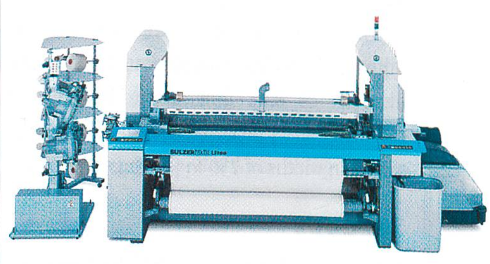


*Sulzer Textil Projectile Weaving Machines – weaving tyre cord off a creel behind the machine*

## Airjet weaving for production of high-grade glass fibre fabrics:

Fabrics made of glass fibre yarns are an enclave product among industrial textiles and certainly make special demands on weaving machines.

One major application of glass fibre yarns is the use in reinforcing fabric for compound materials. High mechanical strength and dimensional stability are crucially important. Printed circuit boards as used in the electronics industry fall into this category. Two to seven layers of carrier fabric are coated with synthetic resin. This application makes extreme demands on fabric quality since no filamentation or fibrillation is acceptable.



*Sulzer Textil Airjet Weaving Machine – weaving glass fibre yarns*

## The future of technical textiles and weaving machinery:

Research and development work is being conducted in both the industrial textile as well as weaving machinery areas. Basic and application oriented research is necessary to find new materials, to improve properties of existing materials and products and to find new application areas for technical textiles.

### High-tech R&D studie are to be extended to include future analysis about

- Polymers
- Fibres
- Yarns
- Weaving resp. manufacturing methods
- Finishing
- Coating
- and tackling industry relevant problems

### Weaving Machines:

As the major manufacturer of Projectile, Rapier, Airjet as well as Multi-phase weaving systems, Sulzer Textil is in the forefront of tried and tested weaving machines for any kind of fabrics for standard, and in particular, technical end uses.

World-wide more than 25 000 of our machines are used in technical and industrial fields. Customising weaving machinery to suit the demands of extreme applications in the field of technical textiles opens up new horizons in fabric manufacturing. Many weaving mills complement their manufacturing programme with technical textiles in order to have a second leg to stand on.

Assistance can be given for project planning, textile technical consulting, weaving trials and customer support service – Services which may come in handy if new markets for technical textiles are to be developed.

We are just a stone's throw away.

*Sulzer Textil AG, CH-8630 Rüti*

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Bericht Deutsch

# Neuigkeiten an der ITMA 99 von «Heberlein»

*von Christine Harder, ETH Zürich*

Die Firma «Heberlein Fasertechnik» produziert Anlagen, die durch Luftverwirbeln die Qualität von Filamenten verbessern oder verschiedene Filamente miteinander verknüpfen.

### Spinnen, Verstrecken, Texturieren

Zum Verspinnen, Verstrecken und Texturieren von Filamenten bietet Heberlein die sogenannte **PolyJet**-Serie an. Zum Tangeln textiler FDY/SDY-Garne wird der **PolyJet-SP** eingesetzt, der eine gute Gleichmässigkeit des Materials und eine hohe Intensität der Tangelpunkte bietet. Materialien mit einer Feinheit bis zu 660 dtex können verarbeitet werden. Mit diesen Anlagen können Spinngeschwindigkeiten bis zu 6000 m/min erreicht werden. Für das Spinnen von POY-Garnen kann der **PolyJet-SP ECO** verwendet werden. Zum Tangeln technischer Garne beim Spinnen und Verstrecken wurde die **PolyJet-TG**- Serie entwickelt. Anlagen aus dieser Serie können Polyester, Polyamid und Polypropylen mit hoher Zähigkeit und einer Feinheit bis zu 2500 dtex bei Spinngeschwindigkeiten bis 5500 m/min verarbeiten. Zum Strecktexturieren von BCF-Garnen können Anlagen aus der **PolyJet-BCF**-Serie verwendet werden. Diese Maschinen eignen sich für Polyamid- und Polypropylen-BCF-Garne mit einem Titer zwischen 750 und 4500 dtex. Abhängig von den Eigenschaften des Garns werden Verarbeitungsgeschwindigkeiten bis zu 5500 m/min erreicht.

### Streckzwirnen, Streckspulen, Falschdrahttexturieren, Umwirbeln

Für die Prozesse Streckzwirnen, Streckspulen, Falschdrahttexturieren und Umwirbeln empfiehlt Heberlein das **SlideJet**-Konzept. Die SlideJet-Generation bietet viele Möglichkeiten zum Tangeln verschiedener, auch komplizierter, Garne an.

### Falschdrahttexturieren bei hoher Geschwindigkeit

Um den hohen Ansprüchen beim Prozess des Falschdrahttexturierens zu entsprechen, entwickelte Heberlein die Maschine **PolyJet-FT25-2**. Diese Anlage kann Garne mit einem Titer zwischen 50 und 330 dtex bei einer Prozessgeschwindigkeit bis zu 1200 m/min verarbeiten. Garne, die durch das Falschdrahttexturieren verarbeitet werden, haben die Tendenz, gerade bei hohen Prozessgeschwindigkeiten, Schlingen zu bilden. Um die Schlingenbildung zu reduzieren bzw. zu verhindern, wurde die Maschinenkomponente **Detorque-DJ** konstruiert.

### HemaJet Lufttexturieranlagen

An der ITMA 99 werden weiterhin Maschinen aus der **HemaJet LB**-Serie zur Herstellung von Schlingengarn gezeigt. Durch Anwenden einer neuen, resistenteren Keramik wurde die Haltbarkeit der Anlagen verbessert und ihre Reinigungszyklen verlängert. Die Leistung der HemaJet-Serie konnte bei gleichem Kompressionsdruck der Luft um 30% erhöht werden. Die Geschwindigkeit des Texturierprozesses an einer Laboranlage liegt bei 800–1000 m/min. Für Bauschgarne kann die **HemaJet EO-52** eingesetzt werden. Sie wird für Garne aus Polyester und Polyamid mit einem Titer von 150 bis 3500 dtex verwendet. Es kann aber auch Polypropylen mit einem Titer grösser als 2200 dtex texturiert werden.

### Zusätzliche Komponente für Lufttexturieranlage

Für die Herstellung von Noppengarn bietet Heberlein ein spezielles System an. Damit kann die Noppengrösse, der Abstand zwischen den Noppen und die Dicke der Noppen elektronisch überwacht werden.